

REMARKS/ARGUMENTS

This is in response to the Office Action of May 16, 2005. The period of response has been extended by three (3) months by the enclosed Petition for Extension of Time. In that Office Action the Examiner noted that corrected drawings were required. In addition, the Examiner rejected claims 1-2 and 4-7 under 35 U.S.C. 102(b) as being anticipated by Schneider (USPN 4,960,970). Claims 3 and 8 were rejected under 35 U.S.C. 103(a) as being unpatentable over Schneider in further review of Mosavi et al (USPN 6,252,195).

Applicants have enclosed herewith corrected drawings in accordance with the Examiner's requirements.

The rejection of claims 1-2 and 4-7 under 35 U.S.C. 102(b) as being anticipated by Schneider (USPN 4,960,970) is respectfully traversed.

Applicants respectfully submit that the Schneider reference does not anticipate nor disclose the present invention. In contrast to the present invention, Schneider discloses a plano-convex lens, a form of a spherical lens. The lens required in the practice of the present invention is a spherical lens. In particular, the type and configuration of spherical lens required by the present invention allows parallel beams of light to enter the lens from one side, pass through the lens and then exit the lens in a way that maintains convergence of the incoming parallel beams to a single focal point.

Another distinguishment from the present invention is that the plano-convex lens placement in Schneider is not connected to the frame supporting the workpiece and is thus isolated from workpiece vibrations. Unlike Schneider, the apparatus and method of the present invention requires a spherical lens to be placed on the same frame as the workpiece so as to be subjected to the same vibrations as the workpiece. Thus the relative position of the spherical lens with respect to the workpiece is essentially fixed. This arrangement allows for the workpiece and lens to vibrate and for the laser light to pass through the lens and remain essentially at a single focal point on the workpiece. This structural arrangement described by Schneider does not result in this benefit.

In addition, the apparatus and method of the present invention does not monitor vibrations, look for any changes in vibrations, or use such information to actively adjust laser

pulse or focal point. The present invention provides for concurrent, passive (i.e., automatic) routing of laser light to an essentially single focal point relative to the workpiece.

Schneider's purpose in assessing the time for breakthrough is to use this information to make adjustments in laser parameters (focal length or pulse) in preparation for drilling a subsequent hole. This is to assist in assuring that the hole diameter of the next hole to be drilled will be close to a desired target dimension. Thus, Schneider describes a system to control hole diameter and shape. To determine the time for breakthrough, Schneider monitors workpiece vibrations to detect a change in vibration that is the result of the laser breaking through to the far side of the workpiece wall. The present invention does not rely upon vibration monitoring to make any active adjustments to laser parameters. Rather, the apparatus and method of the present invention are concerned about maintaining a constant focal point relative to the workpiece to assure an accurate location for hole drilling. This is neither disclosed, suggested nor taught by Schneider.

Accordingly, on the basis of the foregoing discussion, the Examiner is respectfully requested to withdraw this rejection.

The rejection of claims 3 and 8 under 35 U.S.C. 103(a) as being unpatentable over Schneider, as stated above in further review of Mosavi et al. (USPN 6,252,195) is respectfully traversed.

As previously mentioned in the discussion of the rejection under 35 U.S.C. 103(a) above, Schneider does not describe or suggest how to maintain an essentially constant focal point relative to the workpiece when laser drilling. Indeed, Schneider does not recognize the problem solved by Applicants' novel apparatus and method. Mosavi discloses a method of drilling bore holes in surgical needles using a diode pumped Nd-YAG laser. Mosavi neither discloses nor suggests the apparatus and method of the present invention. The combination of the disclosures and teachings of Schneider and Mosavi et al. would not suggest the method or apparatus of the present invention, and the Examiner has pointed to no teaching suggesting the desirability of the two references.


Accordingly, on the basis of the foregoing discussion, the Examiner is respectfully requested to withdraw this rejection.

Therefore, on the basis of the foregoing discussion, the Examiner is respectfully requested to withdraw her rejections and allow the claims of record.

Respectfully submitted,

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